

Modelling HF Spectral Occupancy over the eastern Mediterranean

H. Haralambous⁽¹⁾, L. Economou⁽²⁾, H. Papadopoulos⁽¹⁾, P. Vryonides⁽¹⁾

(1) Frederick Research Center, Nicosia 1036, Cyprus

<http://research.frederick.ac.cy/>

(2) Intercollege Limassol 3507, Cyprus

The HF band (3-30MHz) is primarily utilised for long range communications via the ionosphere. However only a fraction of this resource is usually available due to unfavourable propagation conditions imposed on the HF channel by solar activity and geomagnetic. In this respect interference from other users is considered a significant problem to overcome, in order to establish viable links at low transmission power. In the design and performance evaluation of practical HF communication systems, it is essential to use procedures that assess the detrimental effect of interference from other users in a near real time mode. These procedures can extend system capability to estimate interference background, in the context of real time channel evaluation (RTCE) in order to advise operators on typical interference occupancy levels and to improve the quality and reliability of radio communication services through adaptation of communication parameters.

The aim of this paper is to discuss the preliminary investigation into the possible application of data driven and statistical models to predict spectral occupancy in the HF spectrum over the eastern Mediterranean region. The dataset of diurnal occupancy measurements used for the model development was taken over a period of more than one year in the frames of project under Frederick research Center, to measure systematically and to analyse the occupancy of the entire HF spectrum over Cyprus. The measure of occupancy used is congestion, which is defined to be the probability of placing at random, a bandpass filter of a given bandwidth in a given ITU defined frequency allocation, such that the RMS value of the filter output signal exceeds a predefined threshold level.